AN OBSERVATION CONCERNING THE DEVELOPMENT OF EXCISED SNAPDRAGON BUDS IN THE PRESENCE OF RESPIRATORY INHIBITORS

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During a study involving the isolation of young snapdragon buds from the stem and their maintenance, floating, upon solutions containing respiratory inhibitors (Brown, 1959) it was noted that frequently abnormal development would occur. More interesting, the activity of several inhibitors resulted in flowers which were characteristically misshapen to give what might be described as a gaping appearance.

The fact of interference with the metabolism of the developing floral parts by known respiratory inhibitors is not in itself, of course, particularly surprising. Had the outcome of contact with the inhibitors been solely a slowing down of the pattern of development or its cessation, this would have accorded with expectation. But the regular peculiarity of the resulting malformation, indicating a specialized or localized activity by the inhibitors, led us to seek information about the developmental pattern of the flowers in this abnormal environment.

MATERIALS AND METHODS

Snapdragons, *Antirrhinum majus* L. cultivar. Candlelight, a tetraploid, were grown to flowering under greenhouse conditions. The young buds, averaging about 15 mm. were carefully cut from the plant and, after the sepals were coated with low melting-point paraffin, were mounted on lucite plates with the floral stalks protruding through holes drilled in the plates. The mounting was sealed with additional paraffin so that when the plates were floated, only the floral stalks would be in

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contact with test solutions for approximately 72 hours. Record of development was made by time-lapse photography.

A Grass kymograph motion picture camera was actuated by a rotary switch adjusted to expose one frame every twenty minutes. The light of three one-hundred-watt lamps, diffused, provided illumination. Exposure was f22 for 1 second with Eastman pantomic-x film.

Buds were floated on test solutions in small glass vessels. The vessels and buds, enclosed within the humid atmosphere, provided by a glass aquarium tank, were photographed through the wall of the tank. Solutions were 10 percent sucrose for controls, 10 percent sucrose and either .1 or .05 percent sodium azide for the experimental plants.

In the earlier study, which had not been directed toward floral morphology, twelve inhibitors had been applied under conditions similar to those described here.

RESULTS AND DISCUSSION

It had been noted that at .1 percent concentration, sodium arsenate, sodium azide, and sodium fluoride caused, with varying intensity, a characteristic deformity of developing excised snapdragon flowers. In the photographic observations .05 as well as .1 percent concentrations of sodium azide were found effective.

Study of the photographs indicates that it is abnormality of the upper lip of the bilabiate corolla which is largely responsible for the character of the "gaping" flower. Figure 1 illustrates this type of flower with its upper lip folding backward so that essential parts are largely exposed where they would be concealed by erect stature of the upper lip in normal flowers.

Azide inhibition, frequently linked to phosphate transfers (James, 1953), might be expected to affect petal development.

The present observations are, of course, amenable to more than a single hypothesis. The characteristic malformation may result from

the indirect effect upon an auxin transport system or, more simply, relate to the distribution of inhibitor consequent upon the vascular anatomy of the flower.

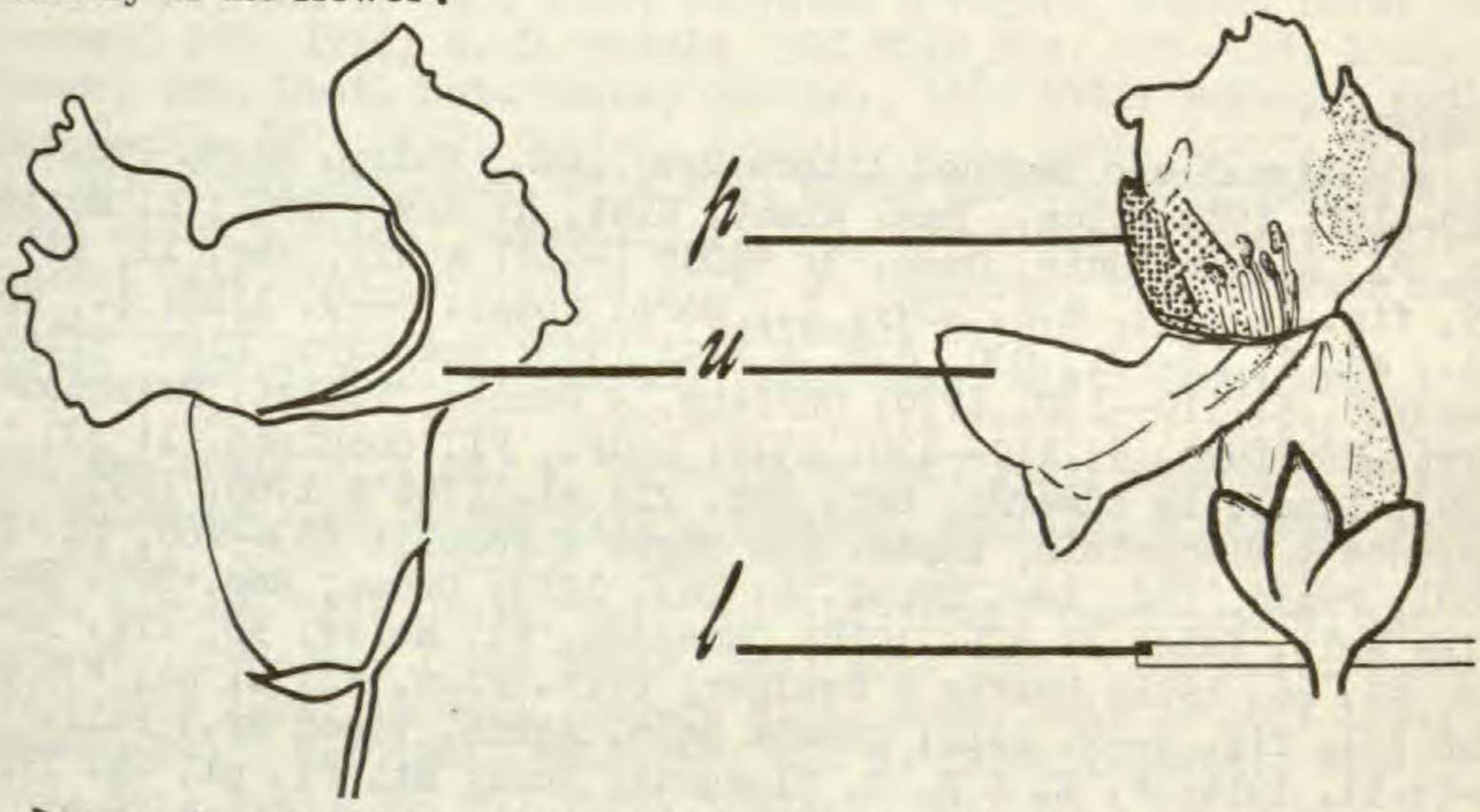

Figure 1. Normal and 'gaping' flowers (l, lucite plate; u, upper lip; p, palate).

The authors find attractive also the possibility that a relationship of endogenous respiration to the efficacy of the inhibitor is involved. Siegelman, Chow, and Biale (1958) found, in rose, that the effectiveness of a metabolic agent, was inversely related to the respiratory rate of the tissues. Hence it seems not unlikely that, within the petal, localized differences in endogenous rates could, with the inhibitor present, effect the developmental pattern reported here.

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LITERATURE CITED

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